THE POLAR TIMES

North Pole tourists are met by Ellesmere Island natives upon return from successful landing on top of the world.

Skip Voorhees, Photo

Meeting Near Pole to Take Up Antarctica's Future

By WALTER SULLIVAN

The New York Times/Dec. 30, 1984

Two planes laden with diplomats and scientists from about 30 countries and a variety of specialized agencies are to glide down at a remote research station near the South Pole Jan. 7, where a special workshop is tobe held on the future of Antarctica.

The visitors, from developing as well as industrialized countries, will step out into an extraordinary setting. A cluster of huts has been set up on the broad expanse of ice where the Beardmore Glacier begins to flow off the Polar Plateau. Distant mountains barely poke their summits above the 9,200-foot-thick ice.

Past this spot, 72 years ago, Robert Falcon Scott and his companions trekked wearily on their return from the Pole, 450 miles to the south, having found that Roald Amundsen of Norway had reached it first. None of the British explorers survived.

The goal of the workshop, organized by the Polar Research Board of the National Academy of Sciences in Washington, is to bring home to the visitors the fact that Antarctica remains a region where human survival depends heavily on modern technology and long-range support.

Furthermore, in light of efforts by some third world nations to replace the Antarctic Treaty with some form of United Nations regime, the workshop will seek to demonstrate the strengths of the existing treaty system.

Future of Continent at Stake

At stake, in the long run, is the future of the one remaining unexploited continent. Its resources, largely but not entirely buried under ice, are presumably comparable to those of other large land masses.

The Antarctic Treaty was originally signed in 1959 by the 12 nations that had conducted research there during the International Geophysical Year of 1957-58. They included the seven countries claiming pie slices of the continent: Argentina, Australia, Britain, Chile, France, New Zealand and Norway.

The nimbly worded treaty did not require them to forfeit their claims, but merely to set them aside without prejudice to their future status. The other participants were Belgium, Japan, South Africa, the Soviet Union and the United States.

Since then four more countries, Brazil, India, Poland and West Germany, have become full members of the treaty system by becoming active in Antarctica.

Sixteen others have adhered to the treaty but are not entitled to vote on policy matters because they have not established permanent stations or performed extensive research in the region. These are China, Denmark, Italy, the Netherlands, Spain and Sweden; five members of the Soviet bloc, Bulgaria, Czechoslovakia, East Germany, Hungary and Rumania; and several developing countries — Cuba, Papua New Guinea, Peru and Uruguay.

Fears in the Third World

Until recently the treaty regime operated smoothly. In 1991, however, it will become open to revision and some third world countries are expressing fears that the treaty members, acting as an exclusive club, would exploit Antarctic resources that should be treated as the property of mankind.

In 1983 "The Question of Antarctica" was placed on the agenda of the United Nations General Assembly. The Assembly was asked to study the treaty system and member states were asked to submit their views on the matter. Fifty-four had done so by last Oct. 29, when Secretary General Javier Pérez de Cuellar completed his report, which was issued a two days later.

Nigeria said the treaty "fails to acknowledge the status of Antarctica as a common heritage of all mankind." Pakistan proposed that the treaty be replaced by one under the United Nations.

According to the Secretary General's report, "It has yet to be proved that there are mineral resources in Antarctica worth exploiting," except for possible off-shore oil reservoirs.

In dealing with the Antarctic Treaty the United States and the Soviet Union have tended to see eye-to-eye far more often than in other areas. Yuri M. Rybakov, chief of the Treaty and Legal Department of the Soviet Ministry of Foreign Affairs, is participating in the workshop on the Beardmore Glacier and it is he who will explain the treaty system.

Among those who have accepted invitations to the workshop are officials from Antigua and Barbuda, Kenya, Malaysia, Peru, Sierra Leone, Tunisia and Uruguay. They are participating as individuals rather than as national representatives. Others in the party will be officials from the treaty nations; China and from such agencies as the International Union for the Conservation of Nature and Natural Resources.

According to Dr. James Zumberge, president of the University of Southern California, the workshop chairman, funds from the ARCO, Mellon, Ford, Hewlett and Tinker foundations as well as the National Geographic Society will help enable participants to reach Christchurch, New Zealand.

There, from Jan. 4 to 6, they will be outfitted with polar clothing and briefed on polar survival. At the Beardmore camp they will attend sessions on legal, political and scientific aspects of Antarctica, the treaty system and how it deals with protection of the environment and conservation of natural resources.

On Jan. 13, after a visit to the South Pole Station, the participants will be flown back to Christchurch. The National Science Foundation is financing the flights. The Beardmore camp has been set up as a base for explorations a year from now in that fossil-rich region.

The Antarctic Mountains in Queen Maud Land are featured on two stamps to be issued by Norway April 18.

Norway will issue two stamps April 18 calling attention to the Antarctic Mountains in Queen Maud Land.

The 2.50-krone stamp depicts "Sagbladet" (The Saw Blade). The 3.50kr shows "Hoggestabben" (The Chopping Block).

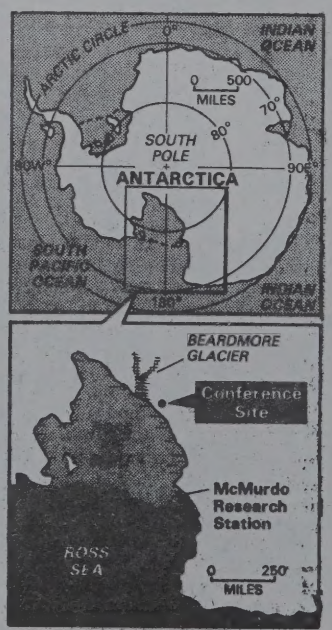
Both designs are based on photographs taken by Torbjorn Lunde. Ottar H. Johannessen is responsible for the layout.

Emil Moestue A/S printed nine million 2.50kr and three million 3.50kr using multicolor offset. The stamps were printed in sheets of 50.

Special covers will be issued marking the Norwegian scientific expedition in the Antarctic during the winter of 1984-85.

The covers, which were sent on the ship *Andenes*, will be franked with the two Antarctic Mountains stamps on their return to Norway.

They also will bear a special expedition marking. They will be postmarked in Oslo on the day of issue of the stamps.



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AUGUST HOWARD, Editor

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The Polar Times

No. 100 *JUNE 1985*

Delegates Debate Antarctic's Future

The New York Times / Jan. 29, 1985

By DEBORAH SHAPLEY

BEARDMORE CAMP, ANTARCTICA

DIPLOMATS from developing countries who have been arguing for international control over Antarctica have had a first-hand look at their would-be real estate this month. They attended a conference as unusual as its setting high in this cold, sunlit mountain wilderness.

For the participants, midnight hikes over flat blue icefields to rock outcrops in snow-draped mountains, scientific lectures, singing with an accordion, and even a game of cricket served as after-hours entertainment.

The meeting brought together 57 scientists, lawyers, diplomats, environmentalists, journalists and old polar hands from 25 countries for six days in this remote camp, a 90-minute flight from the main United States base at McMurdo Sound.

The purpose of the conference was to see whether private discussions in Antarctica could help break the standoff in the United Nations over whether this continent will be governed in some manner through the United Nations or by the present Antarctic Treaty, which divided the continent among a dozen countries a generation ago.

Most participants said many foundations for compromise had been arrived at as a result of the off-the-record ground rules and the fact that participants spoke in personal, not official, capacities.

In addition, "the reality of Antarctica was staring them in the face," said R. Tucker Scully, the chief American negotiator on Antarctic matters. "I think that exercised a catalytic effect."

Treaty Challenged as Unfair

The Antarctic Treaty was concluded by countries having Antarctic scientific programs during the 1957-58 International Geophysical Year: Argentina, Australia, Belgium, Chile, France, Britain, Japan, New Zealand, Norway, South Africa, the United States and the Soviet Union. Since 1961, four countries, Poland, West Germany, Brazil and India, have joined the treaty as voting parties. Another 16 countries have joined as nonvoting parties.

Several developing countries have challenged the treaty as unfair, because it requires heavy financial investment in an Antarctic scientific program. The treaty parties are negotiating a separate agreement on development of Antarctic minerals, which also has been denounced as unfair by nonparties. Malaysia led the attack in the 38th and 39th General Assembly sessions, when some nations called for Antarctica to be declared a "common heritage of mankind."

The United States opposes any United Nations discussion that might undermine the treaty's validity or reopen its terms. In addition, the United States argues that the treaty is evolving into a system of administration that may involve more nations than it does now. So the Government agency that runs the United States Antarctic scientific program, the National Science Foundation, was willing to transport the group aboard Lockheed C-130 cargo planes and build this camp for the meeting. The meeting was sponsored by the nongovernment National Academy of Sciences.

Opening 'Pandora's Box'

During the meetings here, those from treaty party governments defended it vigorously. Yuri M. Rybakov, head of the Treaty and Legal Department of the Ministry of Foreign Affairs of the Soviet Union, warned that changing the treaty could reopen the dispute on territorial claims which is "frozen" in a key part of the treaty text. "One can open a Pandora's box," Mr. Rybakov warned. "That would be a bad heritage for mankind."

The Malasian ambassador said his country would still press for the United Nations to create a committee on Antartica. Jose Sorzano, of the United States Mission to the United Nations, said the United States would continue to press to have the Antartic question dropped.

Other diplomats indicated grounds for compromise. Abdul Korana, Ambassdor of Sierra Leone to the United Nations, said he could see the debate continued outside the United Nations so long as nonparties like Sierra Leone could participate.

The camp, consisting of five low-lying huts, a food cache, and an igloo where the Danish delegates slept one night, will be used for research on the glaciology, geology and paleontology of the region previously little explored by man. It is near the head of the Beardmore Glacier, which Robert Falcon Scott and his companion climbed during their ill-fated South Pole expedition of 1911-12.

Delegates slept in sleeping bags and sometimes ventured barefoot through the snow to the bathroom.

A day trip by air to the South Pole enabled the first representatives of Peru, Greece, Tunisia, South Korea, Uruguay, and Malasia to set foot at the geographic South Pole. Two Chinese planted their nation's flag, while Ambassador Korana had the United States station carpentry shop make an impromptu sign commemorating his arrival on behalf of Sierra Leone.

Seabees Modernize

By PH1 DAVID LOVEALL

McMURDO STATION — A "modernized" Marble Point, a remote helicopter facility 50 air miles from here, has been officially opened in a ribbon-cutting ceremony by Capt. Brian Shoemaker, Commander Naval Support Forces Antarctica.

Shoemaker praised six Navy Construction Battalion Seabees who built the facility and the teams who hauled materials and pre-fabricated shelters across the Ross Ice Shelf.

The convoys of bulldozers and sleds picked their way around dangerous ice crevasses, taking about 36 hours for each 140-mile trip. Shoemaker lauded the on-site crew for their working 20-hour days for more than two weeks to ready the site for operation this season.

Marble Point now boasts three box-like heated and electrically powered shelters. The site also has a water-making snow melter, a shower, cooking facilities and sleeping quarters for 12 people.

The base will serve as a heliocpter fuel stop, an advanced staging area to shuttle supplies to outlying scientific research camps and, in case of inclement wather, an abort site for Naval air crews.

Marble Point has been in the planning stages from the time it was originally claimed by Rear Adm. George Dufek and Sir Edmund Hilary in 1959.

Antarctica yields its frozen secrets

by Gayle Golden
Dallas Morning News

From December to February, the Earth's frigid underbelly, Antarctica, makes itself habitable.

For most of the year, the frozen continent, which makes up one-10th of the Earth's area, is a harsh place, where 200-mph winds whip across a thick, permanent icecap, and a sunless winter brings a chill that can freeze a person's blood.

But now is Antarctica's summer. Temperatures warm to an average of 20 degrees; the sun's light is constant; and scientists from around the world scurry to conduct their experiments.

Recently, however, that seasonal window is drawing more than just scientists. Two planeloads of lawyers, environmentalists, government ministers, educators and oil executives from 27 countries landed Monday at a scientific camp 200 miles from the South Pole for a weeklong workshop on "the future of Antarctica."

The question concerning Antarctica's future, also to be raised at other international meetings this year, is whether Antarctica can remain a unique model of world cooperation or whether increasing interest in its potential resources will turn it into a continent torn by conflicting political and economic claims.

Since 1961, decisions about Antarctica have been made by an elite group of nations, all signers of a treaty by which they agreed to overlook territorial disputes on the continent in order to support scientific interests.

But in recent years, intimations of vast oil or mineral reserves have given rise to a host of potential conflicts over who, if anyone, has the right to exploit those resources. And although the possibility of harvesting those resources is remote, at least in this century, environmental groups and small nations are increasingly demanding a voice in how Antarctica is managed.

The goals of this week's private conference are modest — simply to acquaint those interested in the Antarctic with just how harsh and technologically demanding an environment it is, said James Zumberge, president of the University of Southern California and chief coordinator of the workshop.

But their visit — arranged by the National Academy of Science's Polar Research Board — is one of many signs that Antarctica is a continent on the edge of political, economic and environmental transition.

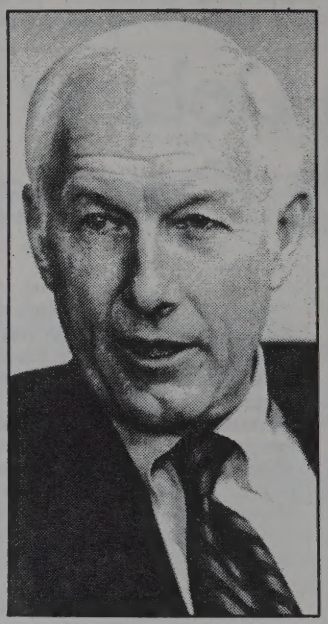
"Until the mid-'70s, the question of Antarctica was one that was not really in anybody's mind, except scientists," said Robert Rutford, president of the University of Texas at Dallas who is another key organizer of the conference.

"Who cared? Here was this continent in the southern hemisphere that was simply covered with ice and snow."

Scientists did care; they saw the area as a valuable natural laboratory to study unusual biological species, monitor weather data, analyze the world's oceans and even search for meteorites.

In 1959, a group of international scientists successfully pushed for an treaty uniting five countries that held scientific interests — Belgium, Japan, South Africa, the Soviet Union and the United States — with seven countries holding territorial claims in Antarctica — Argentina, Australia, Britain, Chile, France, New Zealand and Norway. Since then, four other countries — Brazil, India, Poland and West Germany — have signed the treaty.

The agreement allowed countries with claims to keep them, but it declared the continent an international territory fully open to inspection. The treaty also barred military or nuclear activity in Antarctica.



James H. Zumberge

In agreeing to disagree about their territorial claims, the treaty nations established an informal, closed-door negotiating style by which they continued to govern the continent, Rutford said. The treaty nations have excluded from their policy meetings news media, environmental groups and even 16 smaller countries that have agreed to adhere to the treaty even though they have not been granted voting rights.

"And the system worked beautifully," Rutford said, as long as the stakes were strictly scientific.

But in the 1970s, the situation changed.

Restriction of commercial fishing off national coasts drew attention to the international waters of Antarctica as a source for krill and other fish.

Speculation about offshore oil was heightened by the discovery in 1972 of methane and other gases in geological core samples from the Ross Sea in West Antarctica. Sizable beds of low-grade coal were discovered in the Transantarctic and Prince Charles Mountains.

Scientists also suggested that gold, silver, copper or other minerals lay under the continent, which scientists believe was once attached to the mineral-rich countries of Africa to form one supercontinent, Gondwanaland.

"The question of economic resources began to be whispered in the halls" at meetings of treaty countries, Rutford said.

Two years ago, the treaty countries agreed on limits to fishing in Antarctic waters. Now, they are working on regulations to govern mineral exploitation — a more difficult matter because the discussions address precisely what the members have tried to avoid: territorial recognition.

"It's a slow, slow process," said Rutford, who is involved in the negotiations.

Fortunately, there is no need to hurry, considering the high costs of exploiting oil in the Antarctic, said John Garrett, a consultant for Gulf Oil in Houston and a representative on the U.S. State Department's Antarctica Advisory Committee.

Garrett has estimated that Antarctica's offshore oil reserves — by far the most promising of all mineral resources — could equal Saudia Arabia's vast oil resources; but he also said the value of his speculations is "exactly nothing."

"You don't know until you actually start looking," he said. "Anyway, it certainly is not going to be economically viable in this century."

Antarctica's permanent icecap, covering 95 percent of the continent with a thickness of nearly three miles, is a formidable obstacle to drilling or mining, he said. Offshore, 5,000-foot-thick ice shelves shift at a rate of 40 miles per day, which would threaten oil platforms and cables.

Before oil companies could see a profit in Antarctica, he said, the price of oil would need to rise from the current $28 to

"well over $100 per barrel" — an "unlikely prospect," considering that at $60 to $75 per barrel, industry can more cheaply synthesize oil from other sources.

Even so, Garrett and others in the petroleum industry want to protect the rights of private companies to develop oil if it becomes economically viable.

Some Third World nations, led by Malaysia, have other ideas. In two debates on "The Question of Antarctica," held last year before the U.N. General Assembly, several countries suggested placing any Antarctic resources under control of the United Nations for the world's "common heritage" rather than leaving them to be harvested by the countries with the technology to do so.

Environmentalists are more generally concerned about any type of mineral or oil exploitation, citing the need to protect the Antarctic's abundant marine life, its unique penguins and seals, its 350 species of lichen and other plant life and its 50 species of birds.

Some have suggested making Antarctica the world's first international park, denying all private claims to minerals and making the continent "a clean mirror to hold up to the rest of the Earth," said James Barnes, director of the Antarctic and Southern Ocean Coalition, an alliance of 150 international groups interested in safeguarding Antarctica's environment.

Barnes is concerned that any economic exploitation would threaten the whole fabric of the treaty by allowing proprietary research, which is now banned.

Antarctica, Barnes said, may be the last chance for the world's nations and industries to discuss their competing interests before economic necessity overrides all other considerations.

"Antarctica is really a place where we can cooperate in learning how to be adults," Barnes added. "That's what it really amounts to."

Soviet Research Ship Trapped in Antarctic Ice

By SERGE SCHMEMANN
The New York Times

MOSCOW, June 8 — The Soviet Union has dispatched one of its giant icebreakers to Antarctica to free a research vessel trapped with 53 aboard in thickening and shifting winter ice.

The icebreaker Vladivostok is expected to reach the stranded Mikhail Somov sometime in early July. But the success of the mission, according to press reports, is far from certain.

The research vessel is mired in ice up to 12 feet thick, hundreds of miles from open sea. The polar night, with its bitter frosts, is rapidly setting in and icebergs are lurking nearby, the press reports say. Once the Vladivostok reaches the trapped ship, it may be able to do little more than stand guard over it until the polar spring.

The plight of the Mikhail Somov was publicized last week when the Soviet press agency Tass published its first account of the story. The incident has quickly taken its place alongside past polar sagas that have been popular in the Soviet press, most notably the tale of the rescue of more than 40 ships from Arctic ice in the fall of 1983.

Under headlines like "Struggle Against the Ice" or "Frozen Epic in the Antarctic," papers have geared up to follow the mission of the 13,000-ton displacement Vladivostok, which is to leave the Soviet Far East port of Vladivostok this week.

According to Tass, the Somov's problems began soon after March 9 when it arrived at the Soviet research station Russkaya, on the Pacific coast of Antarctica. The ship's mission was to rotate staff members before the onset of the polar winter and to bring fresh fuel and supplies.

On March 15, a great storm rose up, with winds of up to 110 miles an hour. The Somov was blocked by heavy ice. The captain, V. F. Rodchenko, maneuvered the ship out through cracks and rifts in the ice field and moved it away from the dangerous area of icebergs.

But the noose of ice tightened steadily until, by the end of May, the Somov stood 500 miles from open sea, solidly jammed in ice that was moving slowly in a southwesterly direction.

According to Yuri A. Israel, chairman of the State Committee on Hydrometeorology, a helicopter flew 77 people, most of the crewmen and scientists, to safety. Fifty-three remained on board to sustain the ship and operate some of its research equipment in the stunning cold, which can reach 22 degrees below zero Fahrenheit, or 30 below centigrade.

"In the difficult conditions of the polar night and freezing temperatures, which reach minus 30, the crew of the Somov under Captain Rodchenko are acting skillfully and steadfastly, fully assuring the needs of the ship," Mr. Israel said. "At the same time, scientific observations on this unexplored region of the Antarctic are continuing."

To Russians, the rescue operation recalled the struggle in the fall of 1983 to free more than 40 ships stranded in Arctic ice north of the Soviet Far East by unexpected ice movements. One ship was crushed and sank, and the others were guided to safety by a flotilla of giant icebreakers.

Another operation that captured the public imagination was an operation earlier this year in which the icebreaker Moskva was sent to the Soviet Far East to break a channel for thousands of white beluga whales that were threatened by ice off the coast.

The aura of romance that surrounds such feats dates at least to one of the legendary rescue operations of Soviet history. It began in 1933 when the ship Chelyuskin attempted the first passage from Murmansk in the west to Vladivostok in the east across the Arctic Ocean. The ship became trapped in ice and eventually sank, but the 111 crewmen got onto the ice and were rescued through the remarkably daring actions of several pilots.

The Antarctic, too, has had its share of glory. A year ago, the Soviet press revealed that 20 scientists and technicians survived a polar winter at their remote station after a fire destroyed their life-sustaining power plant. They lived for 227 days in a tiny hut, heated by makeshift diesel-oil burners and tapping two small diesel engines for a minimum of power, until a convoy brought them a new generator and supplies.

2 found in polar rescue

March 9

London (UPI)—A Royal Navy helicopter plucked an injured polar explorer yesterday from a blizzard-swept ridge in Antarctica, where he and a colleague had been stranded for five days with a small tent for protection.

A Wasp helicopter from the British ship Endurance spotted Lt. Cmdr. Clive Waghorn and Army Lance Cpl. Terry Gill at their tent 3,500 feet up a mountain on Brabant Island.

The Wasp dropped flares to guide in two Sea King helicopters from the Navy support ship Olna. One chopper landed three marines and a doctor near the stranded men.

They found Waghorn "alive, as well as could be expected, and alert," Navy Lt. Chris Pardoe said from the Endurance.

Waghorn fell 50 feet down an icy crevasse and broke his leg while leading a team mapping the island.

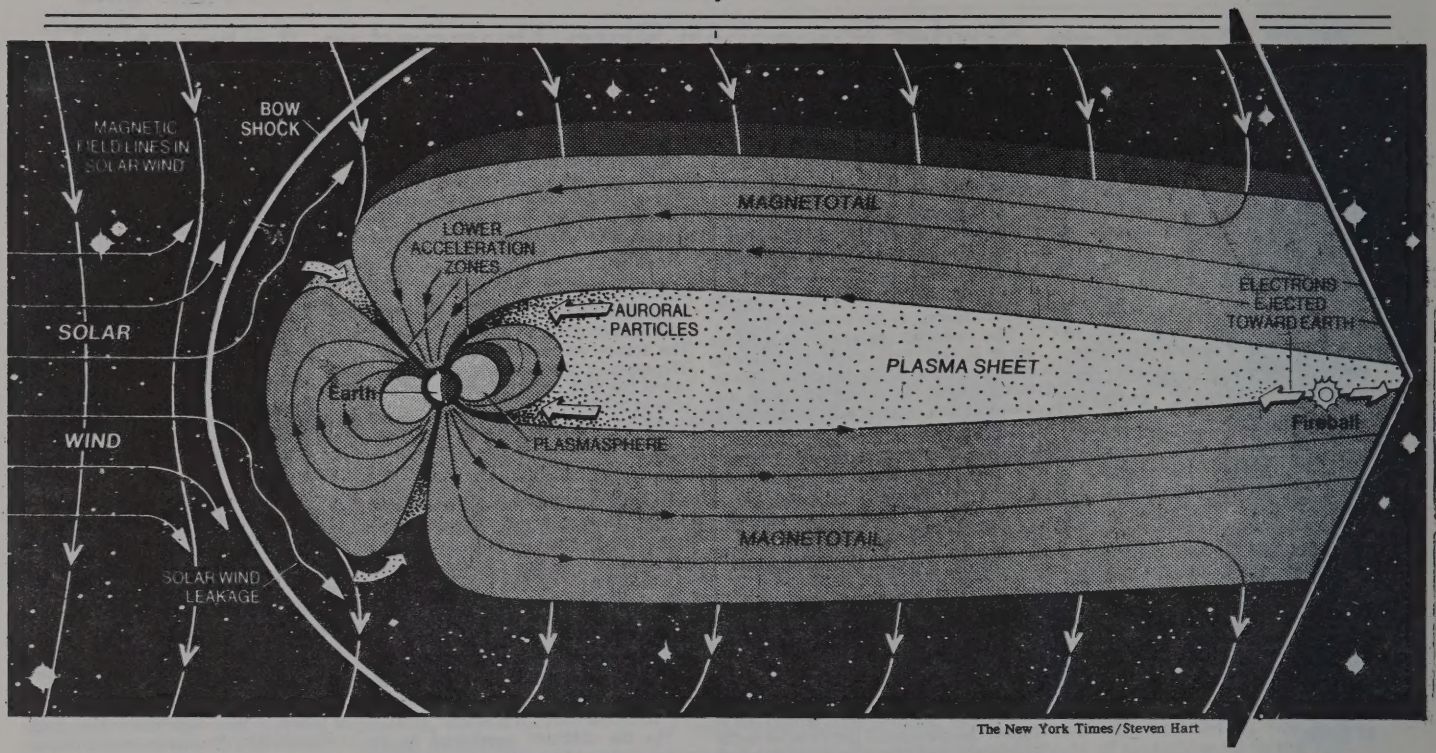
About half an hour after the rescue, the men were picked up by the Sea King and flown to the Olna. The other Sea King picked up 14 marines, who were airlifted to the island to begin a four-mile trek in fog and bone-numbing temperatures to rescue the men.

"Our Wasp helicopter piloted by Lt. Cmdr. John White was able to get through a miraculous hole in the cloud up to the tent site," Capt. Patrick McLaren said in a radiotelephone call from the bridge of the Endurance.

Waghorn and Gill had been out of radio contact and had a nine-day supply of rations when the ordeal began. Repeated attempts to reach them in the past three days had been foiled by foul weather.

Brabant Island lies at the northwestern tip of the Antarctic peninsula, 2,000 miles from the South Pole.

British army Lance Cpl. Terry Gill stayed with Waghorn and injected him with morphine to kill the pain, while other members of the expedition went for help, Oakley said. He said morphine supplies were running low.



The New York Times/Steven Hart

Aurora borealis, long mysterious, yields to new scientific investigation.

By WALTER SULLIVAN

THE aurora borealis, or northern lights, among the most spectacular of celestial phenomena, have been seen since the beginning of time. But now they are being seen as never before as scientists observe them from above, from below and from within.

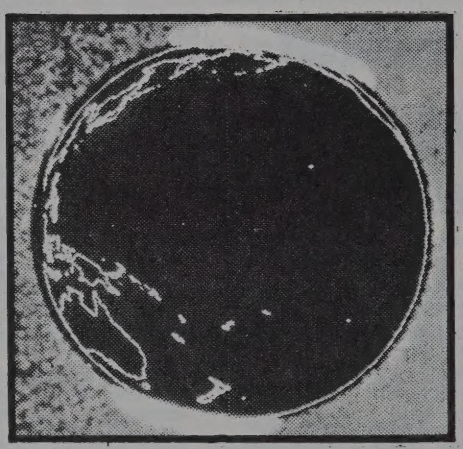
A United States satellite named Dynamics Explorer 1, in photographs from far out in space, records small auroral events about twice a day and a large "storm" every four to six weeks.

The ultraviolet scanner on HILAT, the High Latitude satellite, transmitted images in 1983 that showed for the first time that auroras occur as often over the sunlit side of the planet as on the night side. Because Earth observers can see the northern lights only at night, it had previously been impossible to show that they occur as extensively in the daytime.

Other spacecraft, seeking the source of the energy that drives the northern lights, have identified two regions where the atomic particles that produce auroras are accelerated: One in "fireballs" hundreds of thousands of miles from the Earth and the other in the final plunge of such particles toward the atmosphere.

Auroras have always delighted skywatchers, terrified the superstitious and puzzled scientists. They take many forms: rays that form a curtain of light hundreds of miles high; a many-colored arc reaching from horizon to horizon, or a pulsating, diffuse glow.

The Roman Seneca wrote of them: "These fires present the most varied colors: some are vivid red; others resemble a faint and dying flame; some are white; others scintillate; others finally are of an even yellow and emit neither rays nor projections."



Above: Auroras, according to space observations, are caused by jets of particles accelerated in two areas of the region dominated by the Earth's magnetism. Far out in Earth's "magnetotail," energy derived from the solar wind is released in "fireballs" that eject jets of atomic particles. These are further boosted in lower acceleration zones above points where auroras are common.

Left: From far out in space, Dynamics Explorer 1 has photographed auroras occurring over both poles simultaneously.

To the Norse the dancing northern lights were Valkyrie riding across the sky, or sunlight reflected off polar ice.

Auroras are caused by very high-energy particles, chiefly electrons, plunging from space into the atmosphere along the outermost, closed force lines of the Earth's magnetic field. Those force lines enter the atmosphere in circular zones surrounding each polar region.

When these plunging electrons hit atoms of the high atmosphere the atoms glow in colors indicating their composition and the electron energies. Dr. Syun-Ichi Akasofu, a veteran aurora-watcher at the University of Alaska, likens the effect to that of the "gun" that fires a stream of electrons at the fluorescent screen of a television set. In both cases the ever-changing images are produced by magnetic fields that control the impinging electrons.

What has long puzzled scientists is how these particles, which hit the atmosphere at 1,000 miles a second, gain enough energy to produce their dazzling effects. It now appears that the aurora's original energy source is the swift motion of the solar wind past the magnetosphere, the area of space affected by the Earth's magnetism. On the sun-facing side the magnetosphere is flattened by that wind, which moves at more than a million miles an hour; on the opposite side it is blown into a comet-like tail probably more than a million miles long.

When in late 1983 the satellite International

Sun-Earth Explorer 3 was sent to intercept the comet Giacobini-Zinner it repeatedly passed in and out of the tail, tracing it for 850,000 miles, far beyond the orbit of the moon. Its data and those collected in 1974 by the Interplanetary Monitoring Platform 8, IMP 8, have helped explain the energy-generating mechanism.

As Dr. Louis A. Frank of the University of Iowa interprets these data, electrical energy is initially pumped into the magnetosphere along the boundary of the tail, in a process resembling magnetohydrodynamics, which physicists have sought to use for electric power production.

An ordinary dynamo makes electricity when an armature of material that conducts electricity rotates in a magnetic field. In a magnetohydrodynamic generator a jet of conducting material such as a hot gas is directed through a magnetic field.

In a similar fashion, electrical energy is pumped into the tail of the magnetosphere as the solar wind crosses magnetic field lines derived from the Earth. According to Dr. Frank this energy is stored, then released in "fireballs" that send jets of protons and electrons both outward and Earthward along the tail.

Such processes are of more than academic interest. Auroral displays can heat the atmosphere over the Arctic enough to affect the trajectories of ballistic missiles, or induce currents strong enough to cause corrosion in north-south pipelines or blackouts in power lines.

The auroral process is also of interest to those seeking to emulate the energy process in the sun by using magnetism to compress and heat hydrogen nuclei enough to make them fuse into helium nuclei. They would like to know how magnetic fields downwind of the Earth compress and heat the electrified gas, or plasma, in the tail with such efficiency.

Dr. Frank said last month he suspects that "fireballs" of energy may occur as far as 400,000 miles downwind from the Earth because some auroras initially appear in the sky on magnetic field lines that lead to a source far out along the tail.

Jets of both protons and electrons from "fireballs" are funneled by the closed force lines of the Earth's magnetism into auroral zones surrounding each pole. These oval zones are centered on the Earth's magnetic axis rather than the axis of its rotation. The northern zone crosses northern Alaska, Hudson Bay, southern Greenland and northern Eurasia.

Closer to the poles, the magnetic force lines are not closed. That is, they are not linked to the region on the side opposite the sun where the particles are accelerated, and thus do not receive auroral particles.

When the magnetic envelope of the Earth is disrupted after a flare erupts on the sun, magnetic lines guiding auroral particles into the atmosphere may be shifted away from the poles, producing displays as far south as Rome and Florida.

At times the total flow of energy into the auroral zone may reach a billion kilowatts, only part of which produces visible auroras. A major recent discovery has been that electrons destined to produce an aurora get their final burst of acceleration along the last few thousand miles of this flow.

The acceleration, as proposed years ago by the Swedish Nobel laureate Hannes Alfvén, results when the incoming jet of electrons passes between layers of electric current that have opposite polarities. These currents, aligned with field lines of the Earth's magnetism, accelerate electrons downward and positively charged particles upward.

Last week Dr. Forrest S. Mozer of the University of California in Berkeley said that direct measurements with the Air Force satellite S3-3 had "pretty well proven" this hypothesis.

Auroral displays on the sunlit side of the Earth are thought to result in part from leakage of particles from the solar wind. Most of this wind is diverted by the Earth's magnetism, but some particles get through.

Last Sept. 11 and Sept. 20, to trace this leakage, a West German satellite 70,000 miles above the sunlit side of the Earth released lithium into the solar wind. Inside the magnetic shield, 30,000 miles up, an American satellite watched for traces of this lithium, but could detect none.

That there is leakage into the tail, however, is evident from detection there of helium atoms stripped of both their electrons, presumably when they were close to the sun.

Carbon Dioxide in Ice

FRENCH scientists, analyzing the air bubbles from a 660-foot-deep ice core they extracted from East Antarctica, have provided the best measure to date of atmospheric carbon dioxide levels in past centuries. Their findings may help scientists predict future increases in carbon dioxide, which could cause a planetary warming through the "greenhouse effect."

Uncertainty about past concentrations of atmospheric carbon dioxide has bedevilled researchers trying to determine whether the destruction of forests as well as the better-documented burning of fossil fuels has contributed to the rising concentration of the gas. A better idea of past levels should also ease calculations of another key variable, the amount of carbon dioxide the oceans have absorbed.

Precise measurements of the carbon dioxide concentration have been made only since 1958. Preindustrial levels have been estimated by examining tree rings, by comparing various measurements taken in the late nineteenth century and by analyzing subsurface ocean waters, but none of these methods is as direct and accurate as studying the air encrypted in ice. When snow on the Antarctic ice sheets is compressed into ice, air is trapped between the grains, creating air-tight bubbles and a lasting record of atmospheric makeup at the time the bubbles are sealed off.

The French scientists, reporting in Nature, found that atmospheric carbon dioxide was as low as about 260 parts per million some time between 1650 and 1850, before the beginning of the Industrial Revolution with its massive releases of carbon dioxide from coal burning. Estimates of the preindustrial concentration made by extrapolating backward from recent levels — and assuming that fossil fuels were the only sources — had yielded a figure of about 295 parts per million. The difference between the two figures, the authors of the new report assert, indicates that human alterations of the planet's vegetation, presumably the clearing and burning of forests resulting from the rapid spread of agriculture over the last two centuries, was another important source of atmospheric carbon dioxide.

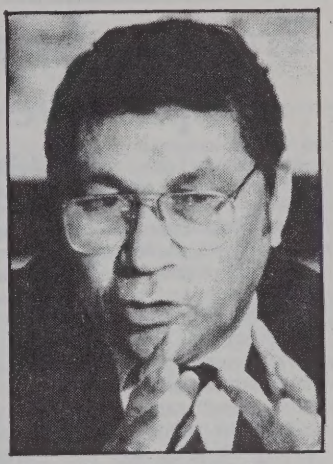
Today the carbon dioxide concentration is about 345 parts per million. Whether changes in land use are now contributing to the steady growth in concentrations of the gas is in dispute.

Relatively Fast Retreat Seen For 40-Mile Glacier in Alaska

WASHINGTON, Feb. 9 (UPI) — The 40-mile-long Columbia Glacier in Alaska has started a relatively rapid retreat, casting off four times as many icebergs as it did a few years ago, the United States Geological Survey reports.

Mark Meier, a glacier specialist in Tacoma, Wash., who works for the agency, said this week that since 1978 the front edge of the glacier had retreated more than a mile and, in some places, more than a mile and a half. He predicted the glacier would retreat 20 to 25 miles, exposing a fjord.

"The current rate of disintegration will likely increase during the next few years," Mr. Meier said in a report issued by the survey.



Jonathon Motzfeldt

Greenland's leader heads to Fairbanks

The Anchorage Times

The government leader of the world's largest island compared Alaska to his country and expressed interest in maintaining friendly ties because of those similarities during a stopover in Anchorage

Greenland premier Jonathan Motzfeldt, himself a native, said because the country established home rule six years ago, the 50,000 Innuits who inhabit the island have more control.

Greenland, though still a holding of Denmark, is now trying to become more involved in world affairs, he said.

He said Alaska and Greenland share common bonds: isolation, harsh arctic climate, abundant wildlife and a large Eskimo population. Only 6,000 Greenland residents are non-native.

Aqqaluk Lynge, Greenland's minister for housing and social affairs who accompanied Motzfeldt to Alaska, said Greenland and Alaska may soon have more in common.

Tracking Icebergs From Air Helps Save Ships and Lives

By JAMES BROOKE

The New York Times/April 12, 1985

GROTON, Conn. — As spring reaches north into Newfoundland this month, the peak of the iceberg season is under way. And the job of tracking the icebergs in the North Atlantic's busiest shipping lanes falls to a little-known Coast Guard unit based here, the International Ice Patrol.

The patrol was created after the luxury liner Titanic rammed a small iceberg 73 years ago this month, punching a hole in her reinforced steel hull. More than 1,500 lives were lost when the liner sank.

The ice patrol has changed substantially since its early days when, in the words of one officer, seamen on cutters searched for icebergs with "their eyeballs and fingertips."

Today, the 16 members of the ice patrol fly over the icebergs in C-130 Hercules planes and are backed by special radar, satellites and computers. "It's a very important mission," said Petty Officer Ray Uebelacker, aboard a C-130. "We are talking about saving ships, saving lives."

Even with the dominance these days of high technology in the tracking of icebergs, the Coast Guard still uses the traditional seafarers' rating system: "growlers" for grand piano-sized chunks, "bergy bits" for cottage-sized bergs, "small" for up to 60 tons, "medium" for 60 to 150 tons and "large" for anything above that.

In the Coast Guard's Ice Center here, a technician taps computer keys, relying on the latest theoretical models for drift and melt to search for a "rogue iceberg."

Thousands of miles to the north, the crew aboard a C-130 equipped with new radar equipment flies over Newfoundland's Grand Banks. They pick up the quarry, and down below, a luminous mass of white glacier ice is silently drifting through fog banks.

The plane's radar surveys a 27-mile swath of ocean and is able to pick up most icebergs, which, because of their low reflectivity, usually go undetected by ship radar. The Coast Guard started using the new radar equipment two years ago. During the 1984 season the patrol identified a record 2,202 icebergs.

About 85 percent of the North Atlantic's icebergs come from 20 vast glaciers on the west coast of Greenland. With thunderous roars, about 10,000 to 15,000 icebergs a year break off from them. For up to 5 years and up to 2,000 miles, the icebergs are carried by currents and eddies in the frigid Baffin Bay, often grounding in inlets or snagging in frozen sea ice.

Only about 1,000 survive to catch the southbound Labrador Current, sometimes called iceberg alley. Once the sea ice starts to melt in the spring, the bergs begin moving down this current at a rate of up to 30 miles a day. Off the coast of Newfoundland, this chill arctic current meets the warm Gulf Stream, sending up almost permanent fog banks that hide the masses of floating ice.

During the average iceberg season, about 135 million tons of ships and cargo ply the Great Circle Route between Europe and North America. Since the International Ice Patrol was started in 1914, there has been no loss of life from collisions between icebergs and ships navigating in areas declared safe in the Coast Guard's twice-daily broadcasts.

But, to save time and fuel, shippers often take short cuts through the danger zone, sometimes with disastrous results. In 1959, the S.S. Hans Hedtoft struck an iceberg on her maiden voyage. She went down with all hands and about 90 passengers. In 1982, a Canadian cargo ship hit an iceberg and nearly sank.

On the Coast Guard plane's radar film, an iceberg the size of an oil tanker will show up as only a flea sized speck. "Is that a berg or a boat?" is a query heard often in the intercom banter between the radar operator and the ice observers. After one such query about a radar sighting 270 miles southeast of Newfoundland, the pilot banked and descended through the clouds to take a look.

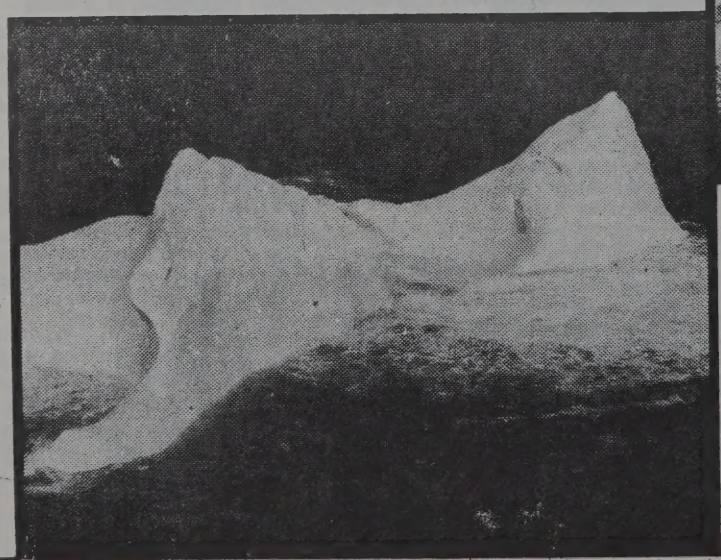
Racing low across the open sea, the plane soon crossed a stately medium iceberg, with two craggy pinnacles rising 10 stories from the dark sea. The reflected brilliance of the ice lighted up the undersides of the plane's wings.

Warm waves washed between the pinnacles, smoothing the lower flanks of the iceberg, and the ice observers said the iceberg was obviously in its death throes. Floating toward a southern death, the iceberg left a wake of bergy bits as a covey of arctic terns wheeled around the ice chunks. The ice melting in the afternoon sun had originally formed from compressed snow that scientists believe could have fallen as long ago as the time of William the Conqueror.

"It is gorgeous when the bergs start to rot out," said Petty Officer Uebelacker. "The pinnacles are like ice castles with pools of light blue water."

The International Ice Patrol was created when representatives of the leading maritime countries signed a treaty deputizing the United States to patrol the North Atlantic during the iceberg season, usually from March to August. Shipping nations share the cost, now $2.5 million a year.

"The whole reason we are there is to determine the limits of hazardous ice and to broadcast to mariners," Comdr. Norman C. Edwards Jr., the commander of the ice patrol, said in an interview at the Ice Center in the Coast Guard complex here.



The New York Times/Steve Miller

A U.S. Coast Guard C-130 plane from its International Ice Patrol unit being prepared at Gander's international airport in Newfoundland for flight in search of icebergs. Bill Burroughs, above, a scanner, at observation window of the C-130, using field glasses for tracking icebergs.

On a recent morning, three ice observers and nine crew members ignored a thick, milky fog hanging over Gander's international airport in Newfoundland and clambered aboard a waiting Coast Guard C-130.

Once airborne, the pilot, Lieut. George Gill, climbed to the smooth air of 8,000 feet, quickly losing sight of the frozen bays and inlets of Newfoundland's Avalon peninsula. As the plane started flying a 1,700-mile grid pattern over the Grand Banks, Petty Officer Preston Simmons, a radar operator, doffed his arctic parka and started monitoring the film from a radar system in the cargo bay.

Despite their use of high technology, the ice patrol has no more control over the bergs than the Viking sailors who centuries ago named them "mountains of ice."

In recent decades, the Coast Guard has tried to destroy icebergs with aerial bombs, underwater torpedoes, naval shells and land mines. The experiments have largely been abandoned as useless. If the tip of an iceberg is blown off, a new tip will invariably rise because seven-eighths of an iceberg is below water. Coast Guard experiments indicate that it would take 1,900 tons of TNT to break up a medium iceberg.

Attempts to track icebergs by marking them with dye-tipped arrows or by embedding radio transponders in their flanks have also failed.

"They calve and roll — to keep something on them is an excercise in futility," Commander Edwards said. "We let Mother Nature take care of them herself."

Strong Evidence of Antarctic Oil

AN analysis of sediment from the floor of Bransfield Strait, north of the Antarctic Peninsula, has yielded "unambiguous" evidence of oil deposits, according to researchers on the West German ship Polarstern. The report brings substantially closer the day when a critical decision must be made on how to dispose of resources on and near the Antarctic continent.

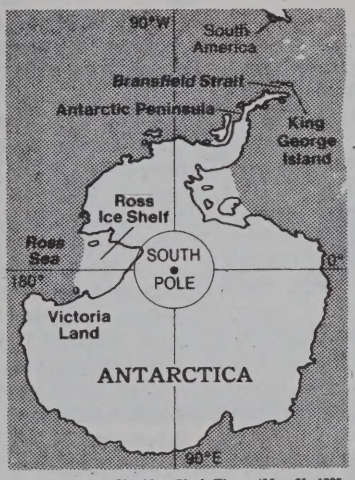
The Antarctic Treaty, signed in 1959 by 12 countries active in Antarctic research, set aside rival territorial claims, ruled out military activity there and provided for unimpeded inspection. It has now been adhered to by 32 countries. Half of them, including India, are active on the continent and thus qualify for participation in periodic conferences on the treaty.

So far such meetings have failed to resolve the resources issue and some third world countries have sought to involve the United Nations in any solution.

The evidence for oil was obtained from a 28-foot cross section of sediment extracted by a coring device from the floor of a basin south of King George Island in the South Shetland Islands.

Authors of the report noted that the area's abundant oceanic life continuously enriches the sea floor in organic material. Presumably the organic matter is then baked by the high upward flow of heat in this volcanic area, accelerating its conversion to oil and gas. Here and there volcanic intrusions push up the sediment layers, creating potential oil reservoirs.

The sediment had "a marked petroliferous smell," the researchers said, and yielded methane gas up to 153 parts per billion, as well as a variety of other hydrocarbons. This, they added, provides the first "unambiguous geochemical evidence of active petroleum source rocks along the Antarctic continent," the authors reported in a recent issue of Nature.



The New York Times/May 21, 1985

Sediment that was analyzed was taken from floor of basin south of King George Island.

China Joins Antarctic

China has joined the list of countries with established bases in Antarctica as the time approaches for resolution of that continent's future. Under the present Antarctic Treaty, which becomes open for revision in 1991, only those countries actively engaged in Antarctic research have a say in administration of the treaty.

The Chinese base, on Fildes Peninsula at the southwest end of King George Island off the northern tip of the Antarctic Peninsula, was chosen in December after nine possible sites were investigated in a four-day period, according to Information North, a publication of the Arctic Institute of North America. More than a mile of ice-free coastline is nearby, and a freshwater lake provides a water supply.

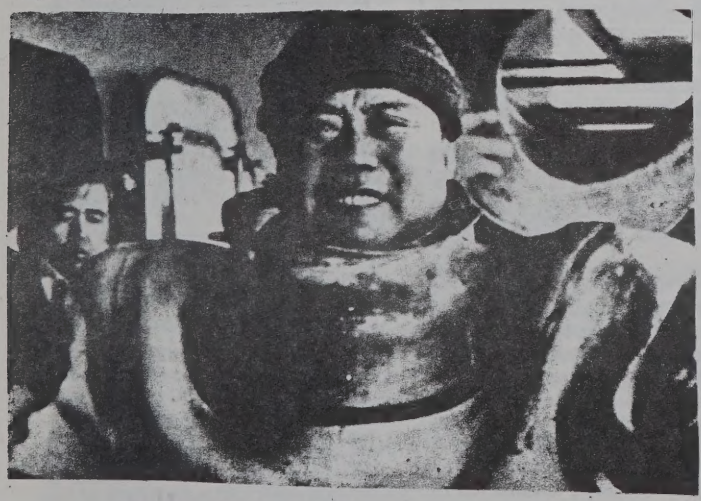
A few months later, researchers aboard the West German research ship Polarstern reported extracting a 28-foot cross section of sea floor sediment south of that island with "unambiguous evidence" of oil deposits there.

Chinese press accounts said the expedition sailed from Ushuaia, Argentina, in two ships, and unloading at the site began Dec. 30 after members of the expedition participated in "an oath-taking ceremony." The base was named "The Great Wall."

It appears likely that China will seek full "consultative" status under the Antarctic Treaty of 1958. This was accorded the original 12 signatories of the treaty, Argentina, Australia, Belgium, Britain, Chile, France, Japan, New Zealand, Norway, South Africa, the Soviet Union and United States. Four other countries, Brazil, India, Poland and West Germany, have since added research facilities, and another 16 have "adhered" to the treaty but are not entitled to participate in treaty decisions.

Third world countries, fearful that they would be unable to participate in exploitation of Antarctica resources, have proposed some form of United Nations authority over Antarctica. The treaty nations themselves have not yet been able to agree on a formula for resolution of the issue.

The New York Times/June 25, 1985



Scientific Investigation ▲

Chinese Diver in Antarctica

Li Baozhu, a diver from China's navy, became the first Chinese to explore the Antarctic seabed. On January 18, he dived 57 meters underwater at a point where glaciers meet the sea at Minfang Bay on George Island. Working with China's Antarctic research team, he collected valuable submarine organisms and investigated the ocean floor.

Banner day for Greenland

Nuuk, Greenland—Greenland, the world's biggest island, will fly a flag of its own for the first time on June 21, its National Day. The flag will be a red and white banner without the traditional Nordic cross.

Families stake Chile's claim

by Richard Boudreaux
Associated Press

Villa Las Estrellas, Antarctica — In search of adventure, Ana Maria Martino de Camacho gave up her nursing job, two servants and a spacious suburban home.

Next, she took a snow survival course in the Andes and moved her family to Antarctica to reinforce Chile's claims to a portion of the continent.

As the Camachos and five other air force families approached their new base on King George Island last March, a snowstorm turned their transport plane back to South America. The colony's delayed start seemed an omen that hostile climate would rule its existence.

But today, after a surprisingly mild first winter (low temperature: 1 above zero), the city-bred volunteers say they feel less unsettled by the cold than by the isolation and awkwardness of communal frontier life in this cluster of pre-fab houses called Village of the Stars.

To a recent visitor, Mrs. Camacho, 34, an ebullient, dark-haired woman, told how the village's beauty and silence had provided the peace she needed to carry her third child, a son born Nov. 21, Chile's first native Antarctican. She also spoke of a new closeness with her husband and two older sons.

Then she totaled up the price of escape from Santiago, Chile's smoggy, agitated capital: She misses fresh meat. Her children long for old playmates. The extended family so important to Chileans is broken up, since grandparents are left behind. Although she is surrounded by ice, water must be chemically treated and tightly rationed.

Mail and fresh produce are supposed to arrive monthly, but sometimes the vegetables freeze between the air strip and the oil-heated storehouse. Once all the eggs came broken. During two dark winter months the plane didn't come at all.

The discontent, at times, is too much for the little colony to contain. Raised voices are heard by everyone. The bickering can defy military discipline, Mrs. Camacho said, so some families simply avoid speaking to each other.

"The Chilean woman can adapt to anything," Mrs. Camacho said over tea in her small but comfortable white home on stilts, with tiny orange-framed windows and freezer doors. "But if they told me I could leave now, I would go back tomorrow to what I had."

Her sentiment is shared by other settlers, but the colony endures. When the original six families end their two-year assignments, air force officials say, 20 more will be taking a turn here. The newcomers will have a new supermarket, a gym and two professional teachers for the one-room schoolhouse.

Under a 1961 treaty, which set the southern continent aside for peaceful purposes, Antarctic claims by seven nations were suspended for at least 30 years. Today 16 countries have year-round scientific stations in Antarctica, whose 6 million square miles of land form 10.3 percent of the world's land area. Europe, by contrast, occupies 3.3 percent of the global land area.

But only Chile and Argentina, whose wedge-shaped claims overlap, are using families with children to enhance those claims if the treaty ever expires.

"We are going to show we can maintain a village with a life practically like any that exists on the continent," said Hernan Huidobro, the air force colonel who runs the colonization campaign from Defense Ministry headquarters in Santiago.

So far, however, Chile's settlement, like a similar one maintained by up to eight Argentine families on the nearby Antarctic Peninsula since 1977, has failed to break an important psychological barrier.

After 90 years of near-continuous exploration, Antarctica remains a remote white expanse where people go not to stay but only to visit, huddled in tiny clusters for a year or two at most, surviving on the knowledge they will return to a hospitable part of the world.

In interviews, the settlers talk about "the real world" back in Chile, where a third of the population lives in the capital. Some worry their children will fall behind in the highly competitive school system

"I cannot see large numbers of people ever wanting to live here permanently," said Dr. German Camacho, an air force surgeon who volunteered for Antarctic duty out of a sense of patriotism. "It still sounds like science fiction to me."

'37 Air Riddle: Siberian Lake Yields a Clue

By THEODORE SHABAD

A Soviet search party in central Siberia says it may have found the remains of a plane and crew that vanished in 1937 on a celebrated pioneering flight across the Arctic from Moscow to Fairbanks, Alaska.

It was a time of daring aviation exploits, and the disappearance of the plane, whose pilot was Sigismund A. Levanevsky, an experienced 35-year-old filer, was front-page news around the world, setting off one of the most intense international rescue efforts in history. But no trace was ever found of the plane, an ANT-6 with the identification number N-209 on its blue fuselage and red wings, or of its six-man crew.

In recent years, Soviet interest in the fliers' fate has revived in the wake of

The New York Times/Nov. 25, 1984

Plane vanished in 1937 on Moscow-to-Fairbanks flight. One theory is that it crashed at Sebyan-Kyuyel.

indications that the plane, instead of flying over the North Pole, might have drifted far to the right, into Siberia.

According to this theory, the plane, its fuel running low, tried a crash-landing on the isolated mountain lake of Sebyan-Kyuyel, 230 miles north of Yakutsk. The lake is at 65 degrees north latitude, roughly the same as Fairbanks.

Soviet aviation buffs have been mounting annual expeditions in an attempt to resolve the mystery, and the Moscow newspaper Sovetskaya Rossiya has been supporting the unofficial efforts.

Ice traps dolphins

Associated Press

Moscow — More than 1,000 dolphins are trapped by ice in a strait of the Bering Sea and a Soviet icebreaker is trying to cut through the floes to free the mammals, the official news agency Tass said today.

Tass said the 10-foot dolphins, of a species also known as the white whale, were being freed by the icebreaker Moscow on what it termed "a difficult cruise."

The government newspaper Izvestia first reported the dolphins were trapped on Jan. 29. It said they became ensnared by ice after following a large shoal of arctic fish into the shallow waters of the strait of Senyavin.

A strong wind blew ice into the opening of the strait and closed off the dolphins' exit to the open sea, it said.

DEW Line keeps vigilant watch

June 11, 1985, The Anchorage Times

Until two years ago, there was no television, only Armed Forces radio. Now, however, the staff has a satellite dish to receive a variety of television programs. They have also collected a library of paperback books. Some employees have learned to tie fishing flies, others work with personal computers or take correspondence courses.

The two dozen employees — receiving up to 12 weeks vacation a year — work 9-hour shifts six days a week. They are cross-trained in other professions to step in should someone become sick or injured. There is no doctor at their beck and call.

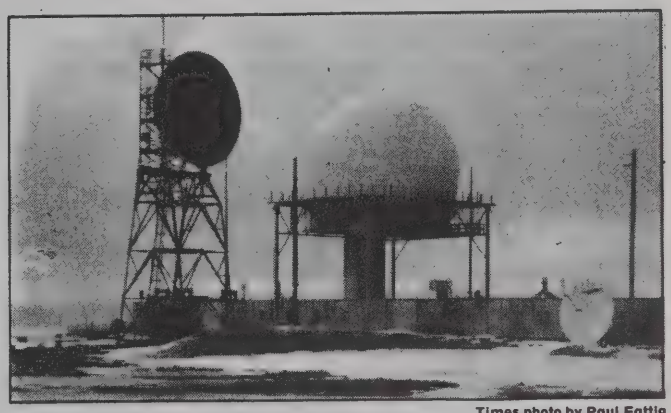
Ironically, the isolation also helps protect DEW line employees from seasonal viruses that plague society. When he travels Outside, Manning expects to spend the first week down with the flu, thanks to his lack of immunity.

First aid, fire fighting, maintenance, safety and security classes are held regularly.

"We are basically in the same position as a ship at sea," Manning explains. "Let's say it's 56 below zero outside and there is a 35 knot wind. The chill factor is 130 degrees below zero. If a fire breaks out, we have to handle it ourselves — fast. There is no fire department around the corner."

The cold is kept at bay by using the waste heat provided by the generators which supply electricity. The station also has its own water and sewage treatment plants.

The exhaust from the special diesel-fired generators heats the water which is circulated through the building. "We do not burn an ounce of fuel to heat the facility," he says.



Times photo by Paul Fattig

Wainwright's DEW Line site, along with others in the system, is preparing for improvements to its missile detection abilities

Snow fell on the station every month last year. For four months during the winter, the temperature never rose above zero.

"It's colder than my first wife's feet," Manning says of the cold winters shrouded in darkness for three months each year.

Manning, who has worked at the station a little over four years, says the restricted status of the station keeps most visitors at bay. But visitors do sometimes come prowling.

"We do get the tundra grizzlies," Manning says. "They are coming out of their winter sleep now. And they're going to be hungry."

The grizzlies haven't been a major problem, he adds.

"Of course, if they are hungry and can smell food, that's another thing," he says, recalling an incident at the Point Lay site some 100 miles south.

"The cook left the window open by the stove and, against the rules, laid out some bacon to thaw overnight," he says.

The aroma caught the attention of a roving tundra dweller that night. Manning was awakened by a startled radio operator who reported a bear at the open window.

"Sure enough, there was a bear with his head and one paw through the window, trying to reach the bacon," he recalls. "I grabbed a broom and hauled off and hit him just as hard as I could on the nose. He went lumbering away."

Manning often calls on two Inupiat Eskimos — Billy Patkotak and Felton Segevan — when expertise is needed to deal with Arctic animals or the weather. The two, who work at the stations as mechanics, live in the village of Wainwright, some eight miles away. Both were born and raised on the North Slope.

Patkotak, who has helped build several stations, began working for the DEW line in 1957, making him the employee with the longest tenure.

"They are both highly competent professionals," Manning says. "There isn't a year goes by, particularly when it comes to survival in the Arctic, that I don't thank God we have them.

Come winter, the two hop on snow machines to race across the frozen Wainwright Lagoon from the village to work. They take a boat during the short summer.

U.S. updates warning system

The Distant Early Warning Line, a chain of 31 radar sites built on the northern coasts of Alaska, Canada and Greenland in 1957, is being upgraded at an estimated cost of $1.29 billion.

However, its current mission of guarding the Arctic sky will remain the same under the "North Warning System," according to a memorandum released by the U.S. Department of Defense earlier this year.

The line, with its six sites in Alaska, was originally deployed to provide early warning in case of an attack on North America across the North Pole.

Each station, reporting to the North American Air Defense Command, is linked to others along the route.

While the importance of the line hasn't diminished, it needs to be improved, the memo states.

"There is an immediate need to replace the DEW Line to address foreseen improvements in Soviet forces," the memo indicates. "The current DEW line contains numerous low altitude coverage gaps, exhibits poor radar performance characteristics and is expensive to operate and maintain."

In place of the older radar units, the new system will include 13 long range and 39 "gapfiller unattended short range radar stations." Sophisticated "Over-The-Horizon Backscatter Radar" will be deployed along the line.

The United States is expected to pay $777 million while Canada will toss in $511 million. Contracts were awarded earlier this year.

Magnetic north pole shifts again

by Gerald Volgenau
Knight-Ridder Newspapers

Toronto, Ontario — Even if you checked your compass lately, you probably didn't notice that the magnetic north pole has moved — again.

Unlike the true North Pole (which stays put on top of the world, if you will), the magnetic north pole that attracts your compass needle keeps slipping northward.

Eleven years ago, Canadian government scientists pinpointed it on Bathurst Island in the Northwest Territories above the Arctic Circle.

Last week, they reported it had moved more than 60 miles north. Now it's in a spot of icy desolation north of that island in the Belcher Channel.

The precise location is 77.0 degrees north, 102.3 degrees west.

"It moves about one degree of latitude (roughly 69 miles) a decade," said Larry Newitt, leader of the two-man team of geophysicists who found the location last May.

Along with its basic movement, it can shift as much as 50 miles in a day, then return to its point of origin, Newitt said.

The present location is about 930 miles south of the true North Pole. Navigators of ships and aircraft need this information for correct compass bearings to determine their locations.

However, Newitt said, "For the average person using a compass, it isn't going to affect them at all."

The pull of the magnetic north pole results from the motion of hot liquid metal (mostly iron and nickel) in the earth's core, about 1,800 miles below the surface, said Newitt.

This motion produces an electric current which creates the magnetic field. That electric current acts in much the same way as the current sent through the coiled wire of an electromagnet. The magnetic north pole moves because of fluctuations in this electrical current.

However, Newitt said, scientists still don't understand why the magnetic north pole has been moving consistently north and somewhat west since 1904.

Newitt and Niblett will use their studies to create a magnetic chart to be released later this winter.

"You've got to be able to get along with people here — that's essential," Patkotak says. "You have to work together."

Bill Larsen, an electrician who began working on the line in 1961, agrees.

"We're a big family," Larsen says. "We have to get along."

But it is probably Stanley Perreira, chef at the site, who lends the most to that family atmosphere. A former hotel chef in Hawaii, he cooks three meals a day Monday through Saturday, followed by brunch and dinner on Sunday.

"They don't complain," he says while preparing a dish of cheese cake with fresh cherries. "But from the beginning to end, the cook does everything here."

Hailing from Hawaii, Perreira, now with a home in Fairbanks, has worked at the site for seven years.

Kenneth Nielsen, a mechanic, has worked on the DEW line since 1962. He has spent the last three months at the site and doesn't expect to leave until Christmas.

He admits some folks get "Bushy" after staying at the site too long. He talks about one fellow who wouldn't cash his checks, using them for markers in magazines.

"There was this other guy with 13 kids," Nielsen recalls. "When he would come home, the kids would parade by so he could greet them. One of the older kids always brought in a neighbor kid to see if his father would notice."

Nielsen laughs heartily at that, but he knows working for the line is hard on family life.

"The wife and I, you could say we have a business relationship."

Caribou herd doubles

Yellowknife, Northwest Territories (AP) — Northwest Territories biologists are pleased but puzzled by the discovery that a large northern caribou herd has apparently doubled in size in just two years.

A 1984 survey on the calving grounds of the Bathurst herd, which ranges from the north end of Great Slave Lake to Bathurst Inlet, suggests the population has increased to 384,000 animals, making it one of the largest herds in the Canadian North.

Aerial photo surveys in 1982 estimated the herd at 137,000 animals.

Nellie Cournoyea, Northwest Territories minister of renewable resources, told the legislative assembly she had no explanation for the dramatic increase in the herd's size.

The herd suffered through nearly a decade of population decline because of overhunting, harsh winters and predation by wolves.

Hunting abuses in the 1960s and 1970s and the death of more than 10,000 animals in northern Quebec last year brought national attention to the plight of the animals and calls for more federal action to protect them.

Mark Williams, the department's caribou technician, said evidence suggests breeding was successful the last two years within the herd, but that alone can't explain the increase.

Caribou from adjacent herds may have joined the Bathurst animals on the calving grounds last year when the survey was done, he said. As well, biologists conducting the surveys may not have known enough about traditional calving grounds to accurately assess the size of the population.

Arctic Panel Gets Chairman

WASHINGTON, March 2 (AP) — President Reagan has announced the appointment of James H. Zumberge, president of the University of Southern California, as chairman of a Federal Arctic Research Commission. Mr. Zumberge of San Marino, Calif., will serve a four-year term on the newly created panel, which is charged with developing an integrated national Arctic research policy for Government agencies.

Soviet Icebreaker Is Trying To Rescue Trapped Whales

MOSCOW, Feb. 23 (AP) — A Soviet icebreaker reached more than 1,000 white whales trapped in coastal ice off northeast Siberia, but the crew was doubtful the whales could follow the ship to safety, the Communist Party newspaper Pravda reported today.

A separate report in the farm newspaper Selskaya Zhizn said about 40 whales had died despite efforts by workers from the nearby Chukchi Peninsula to feed the animals and keep several areas free of ice.

The whales were first reported trapped Jan. 29 after following a large shoal of Arctic fish into the shallow waters of Senyavin Strait off the peninsula, and the icebreaker Moskva began a rescue operation on Feb. 7.

Greenland to honor queen

Greenland will honor the 50th anniversary of Queen Ingrid's arrival in Denmark on a 2.80-krone stamp to be released May 21.

Victor Brockdorff's design shows a portrait of Queen Ingrid with a bouquet of chrysanthemums.

Dogsled ride fulfills queen's dream

Copenhagen, Denmark (AP) — Queen Margrethe II returned today from visiting a dogsled patrol that maintains Danish presence in a vast unpopulated region of Greenland, the world's largest island.

She said the trip had "fulfilled an old dream" to see the remotest part of her kingdom at this time of year.

The 44-year-old queen, accompanied by her husband, Prince Henrik, spent two nights at Daneborg, the base of the Sirius dogsled patrol.

For 35 years, the elite military unit named after the Dog Star has been covering 8,000 miles of rugged coastal land to maintain Danish presence in an area about 50 times the size of Denmark.

Two-man patrols go on treks of up to five months over icy wasteland stretching from the 74th parallel, over the northern tip of Greenland, and down to Hall Land, 20 miles across the Robeson Channel from Canada's Ellesmere Island.

The royal couple ate meals with the commander and the five men at the base and slept in a room vacated by two men on patrol.

The couple took a dogsled ride with two rifle-toting Sirius men who also escorted the queen on a skiing trip. Patrol members carry weapons to protect themselves from wild animals, chiefly polar bears and musk oxen.

Queen Margrethe said one of the most impressive sights of the trip was seeing, on a flight to a weather station at the 85th parallel, musk oxen and polar foxes roaming over ice in what is believed to be the world's largest wildlife reserve.

With the arctic spring approaching, the sun was up about 23 hours a day, but the mercury hovered at minus 22 degrees Fahrenheit.

China to Have World's Coldest Postmark

PEKING (UPI)—China announced plans Monday to establish a postal station in Antarctica that will offer collectors an exotic postmark—"The Chinese Great Wall Station on the South Pole."

The New China News Agency said the polar post office will be built in December, when a 500-member Chinese expedition is scheduled to arrive on the ice for a 150-day stay.

There will be three blocks of four next year, one of them in a new area. The Pathfinders of the Far North block will honor the American explorers who tried, and finally succeeded, in reaching the North Pole:

- Elisha Kent Kane (1820-1857), whose expedition to Northwest Greenland in 1852-55 pushed farther north than anyone before him, into the area now known as Kane Basin and the Kennedy Channel beyond, perhaps sighting the Polar Sea itself.
- Adolphus W. Greely (1844-1935), an Army officer commanding a scientific expedition on Ellesmere Island 1881-84, who reached a new "farthest north."
- Robert E. Peary (1856-1920) and Mathew Alexander Henson (1866-1955), his black companion, who reached the Pole together on April 6, 1909, after sledging across the Arctic Ocean ice from Cape Columbia at the northernmost tip of Ellesmere Island.
- Vilhjalmar Stefansson (1879-1962), student of the Eskimo and exponent of the theory of living off the land, who as commander of the 1913-18 Canadian Arctic Expedition explored the Beaufort Sea, the last great unknown area of the Arctic, filling in the map of the northernmost Canadian islands.

Stamp Collector, June 24, 1985

Team studies sea from ice-floe camp

by Naomi Klouda Anchorage Times

Sitting on icebergs 250 miles out in the Beaufort Sea to watch waves may not sound like much fun, but Jamie Morison describes the experience as a surfer might explain Hawaiian breakers.

Morison, of the University of Washington, is one of a team of 20 scientists from oceanography and polar science institutes in Washington, Oregon and California setting up a tent camp on ice floes far from Prudhoe Bay to chart movements of sea currents.

A C-130 plane chartered from MarkAir made three trips to drop off more than 100,000 pounds of gear — including windows for the tents. "My partner wants to be able to see a polar bear coming," Morison explains.

For the next two months they will be looking at waves from every angle: sound velocity, temperature, salt content, ice layering, and how ice stress affects waves. A helicopter will drop measuring devices shaped like tiny bombs at various points around the camp and buoys will be set up in the surrounding sea, Morison said.

The Arctic Internal Wave Experiment, a $2 million project funded mostly by the Office of Naval Research, will provide information on how submarines could navigate through layers of ice as deep as 150 feet. Other practical applications of the research guides oil companies setting up drilling operations in the sea and predicts which way oil spills would move.

"In consumer type applications, it's important to be able to tell when the ice will advance or retreat in order to, say, bring barges through," Morison said. "The biggest application is probably for drilling ships, just like pilots want to know about the winds, they need to know about waves."

Internal wave movements — waves below the surface — are measured by current meters. The measurements are beamed by computer to a satellite and received at an international NATO data center in France, which distributes the information to various agencies around the world. One of those is the Polar Science Center at the University of Washington where Morison works.

"We're using the Arctic Ocean as a laboratory, and it's an ideal lab this time of year," Morison said. "The days are longer and the temperature keeps the ice stable. Our thinking is that we'll be able to study someplace different to learn more about waves in general. It would be nearly impossible and extremely costly to duplicate the experiment in open sea."

In addition to learning about waves, the scientists will be conducting major research to learn more about weather, ice and random sound patterns caused by waves.

The experiment measuring the acoustics of waves could shed more light on effects of the changing structure of water, because sounds are linked to movements.

Morison has conducted related polar science experiments in Greenland and Iceland, and has been involved in major projects since 1974 at the Arctic Research Lab formerly located in Barrow.

Among the researchers is Dr. Clayton Paulson of Oregon State College of Oceanography, Robert Pinkett and Jim Swift of Scripps Institute of Oceanography in California, and Roger Colony and Roger Anderson from the UW Polar Science Department.

UPI / Reuter

Love Conquers Cold

Warm feelings took the edge off cold temperatures at the wedding of Patricia Manuel and Randall Chambers. The couple, who work at the U.S. Antartic base at McMurdo Sound, were married at the South Pole.

First Antarctic Romance (Marriage)

Today we gaze ambitiously into space, for future colonization, assuming the last frontiers of our planet have been explored and populated. But we have forgotten the great white virgin land of Antarctica. We have forgotten, but internationally famous photojournalist-explorer Bruno Zehnder has not. In fact, it is his contention that the 21st century, with its accelerated technological changes, will make the colonization of the Antarctica a reality for the new U.S. and world pioneers.

Zehnder's love story with the Antarctica began years ago. In a decade, he has made seven journeys to the frigid continent — at times exploring and photographing islands all alone. The spectacular photographs he has brought back to New York for exhibition yielded him not only praise and recognition but a beautiful bride, Heather May, and the fulfillment of his dream to be wed in the place that has absorbed his thoughts for so long. And so it was that Bruno Zernder and his bride, Heather May, became the first couple to wed in a spectacular cave 15 feet beneath the ice in the Antarctica, at midnight.

On January 17, 1985, they had their extraordinary wedding on three feet of snow, on international territory, under the auspices of Argentina. Their civil ceremony was performed outdoors by an Argentine colonel. Black and white was truly the order of the day, for not only did the groom wear black tails and the bride attire herself in a black silk dress with a 20-foot white train, but the couple's marriage was witnessed by a flock of Adelie penguins matching their colors.

Heather had come to see Bruno off on a 15,000-ton icebreaker bound from Argentina to Antarctica, when the Argentine president personally gave her an invitation to accompany the expedition. Zehnder, who had always secretly hoped to wed in Antarctica had taken along a gown, rings and other paraphernalia. He proposed to lovely actress Heather May on the icebreaker and she agreed to wed.

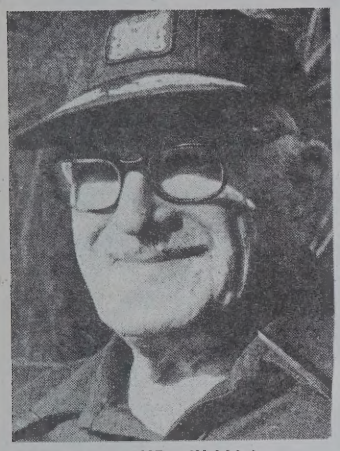
Their original vows were repeated 10 days later in a religious ceremony held in an icy palace, deep underground. After the wedding, the bride danced with each of the 250 men and the couple then retired to a space given to them by the Argentine Base Commander, with a 30inch bed to accommodate the newlyweds.

A 3.70-krone stamp will be issued by Greenland July 25 marking the 250th anniversary of the town of Christianshab. This issue was designed by Jens Rosing and engraved by Arne Kuhlmann.

An explorer and a seal from a drawing by P.V. Tremois is featured on this 30-franc airmail to be issued by the French Southern and Antarctic Territories Jan. 1.

Greenland plans two

The last stamps in the Greenland for 1,000 Years series will be released March 21 by Greenland. The 2.80-krone denomination shows the sailing ship *Hvalfisken* (The Whale). The 6kr represents the Telex service with a globe and communication satellite. Jens Rosing designed the set; Arne Kuhlmann is the engraver. The stamps were printed in intaglio



Amory "Bud" Waite

Explorer, Inventor 'Bud' Waite

Explorer, radio operator and inventor, Amory H. "Bud" Waite, 82, 3248 Valencia Drive, Venice, died Tuesday at home.

Waite was one of three men who rescued Admiral Richard Byrd from a cold and solitary death in the Antarctic in 1934.

In the early 1930s, Waite signed on with the second Byrd expedition to the Antarctic as chief electrician and was part of that expedition for 19 months. It was in March of 1934 that Admiral Byrd set out alone across the ice to establish a weather station.

By mid-July, when the expedition party had not heard from Byrd, Waite and two others set out to find him. They finally rescued the explorer on Aug. 8, 1934.

A veteran of dozens of expeditions, Waite was credited for his design of a radio technique for measuring deep ice. He was awarded the Byrd Congressional Medal, the Exceptional Meritorious Award for Civilian Service, and the Army Research Achievement Award.

Born in Boston, Waite came to the area seven years ago from Oceanport, N.J.

He leaves his wife, Elizabeth; three daughters, Patricia Malone of Georgia, Jacqueline Bigelow of Massachusetts and Susan Richards of New Jersey; two brothers, Robert Waite of Massachusetts and Henry Waite of Nevada; two sisters, Alice Pedersen of Massachusetts and Dorothy Hartman of Englewood; 14 grandchildren; and 13 great-grandchildren.

Jan. 12

MIKHAIL GROMOV, AIR PIONEER, DIES

Soviet Aviator Held Distance Records and Flew Across the Pole to California

The New York Times/Jan. 25, 1985

By THEODORE SHABAD

Mikhail M. Gromov, a Soviet air pioneer who flew nonstop across the North Pole to an emergency landing in a California cow pasture in 1937, has died in Moscow, the Tass press agency announced yesterday. He was 85 years old.

The holder of long-distance flying records in the 1930's, Mr. Gromov teamed up with Andrei B. Yumashev, co-pilot, and Sergei A. Danilin, navigator, to fly an ANT-25 single-engine monoplane from Moscow to San Jacinto, Calif., in July 1937. They covered the 7,100 miles in 62 hours 17 minutes.

They had actually flown as far as San Diego, 70 miles farther south, but had to double back because they were unable to find an opening in the thick fog that blanketed the coastline. When the weary Russians, tottering from fatigue, alighted from their plane to greet startled ranchers, they expressed their immediate needs by flashing little white cards bearing the English words "bath," "eat," "sleep."

4 Hours of Circling

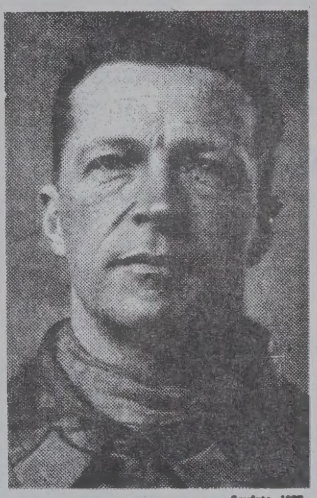
Later, in an interview at nearby March Field, a military airport, they revealed that they had been circling over southern California for four hours, including two hours over San Diego, looking for a place to land. They were originally supposed to set down in Oakland, but changed their mind in an effort to improve their proposed long-distance mark.

The Russians were feted in Hollywood, where Shirley Temple showed them around her studio, and later in New York, where they were received by Mayor Fiorello H. La Guardia.

The Gromov flight was one of three trans-polar Soviet aviation feats that made headlines around the world in 1937. A Soviet trio, led by Valery P. Chkalov, had made it as far as Vancouver, Wash., in June.

A third attempt, led by Sigismund A. Levanevsky, failed. The Levanevsky plane disappeared en route, and an intensive international search failed to locate it. There has been recent speculation in the Soviet Union that it lost its way and lies on the bottom of a remote Siberian lake.

Mr. Gromov learned to fly as a teenager in World War I, became a boxer and weight lifter, and began his endurance flights in the 1920's. He flew a single-engine R-1 biplane from Moscow to Peking in 1925. The following year, he teamed up with a mechanic on an ANT-3 biplane to make a demonstration flight around European capitals, covering a 4,440-mile route from Moscow to Berlin, Paris, Vienna, Prague, Warsaw and back to Moscow in 34 hours 15 minutes.



Sovfoto, 1937

Mikhail M. Gromov

For setting a 75-hour, 7,700-mile long-distance record over a closed course in 1934, Mr. Gromov became one of the first Russians to be awarded the new title of Hero of the Soviet Union.

In World War II, he led a Soviet technical aviation mission to the United States and later commanded an air army on the Soviet-German front. After the war he served as chief of test flights for the Soviet Air Force and bore the rank of colonel general.

Nikolai N. Urvantsev, Soviet Arctic Geologist

The New York Times/May 5, 1985

Nikolai N. Urvantsev, a Soviet Arctic geologist who found one of the world's richest deposits of nickel, cobalt and platinum, died earlier this year, according to information received from Moscow. He was 92 years old.

Mr. Urvantsev, in tramping along the north coast of Siberia in the early 1920's, came across the strategic metals deposit at Norilsk, which has since given rise to the world's largest mining city north of the Arctic Circle.

His death, reported Feb. 25 in the Moscow newspaper Sotsialisticheskaya Industriya, was so little noticed that, two months later, on April 25, a long article in Pravda, recalling his exploits, still described him as a retired professor in Leningrad.

Born Jan. 29, 1893, in Lukoyanov, in central Russia, Mr. Urvantsev made most of his geological discoveries in Arctic Siberia. After graduation from the Tomsk Institute of Technology in 1918, during the civil war that followed the Bolshevik Revolution, he was sent to the north coast in search of coal deposits to be used for bunkering ships.

In the process, he came on what was the far more significant metal deposit of Norilsk, which during World War II served as an indispensable source of hard alloys for Soviet armor plate. The city of Norilsk, which arose on the site, now has a population of 200,000.

Mr. Urvantsev led geological parties to the Arctic archipelago of Severnaya Zemlya in the early 1930's and, on the strength of his fieldwork, was awarded a doctoral degree in 1935 without having written a dissertation.

While working as a department chief for the Institute of Arctic Geology in Leningrad from 1958 to 1967, he was given the title of professor in 1961.

Frozen History

The world's largest shelf of continental ice, roughly equal in area to France, is an apron more than 1,300 feet thick that pushes out from Antarctica over the southern end of the Ross Sea. It is suspected that it sometimes disintegrates, unplugging the flow of ice from West Antarctica and causing worldwide sea levels to rise some 30 feet.

In recent years, as part of an international study of the Ross Ice Shelf, holes have been melted through it to the underlying ocean at a site 300 miles in from where the shelf disintegrates into icebergs.

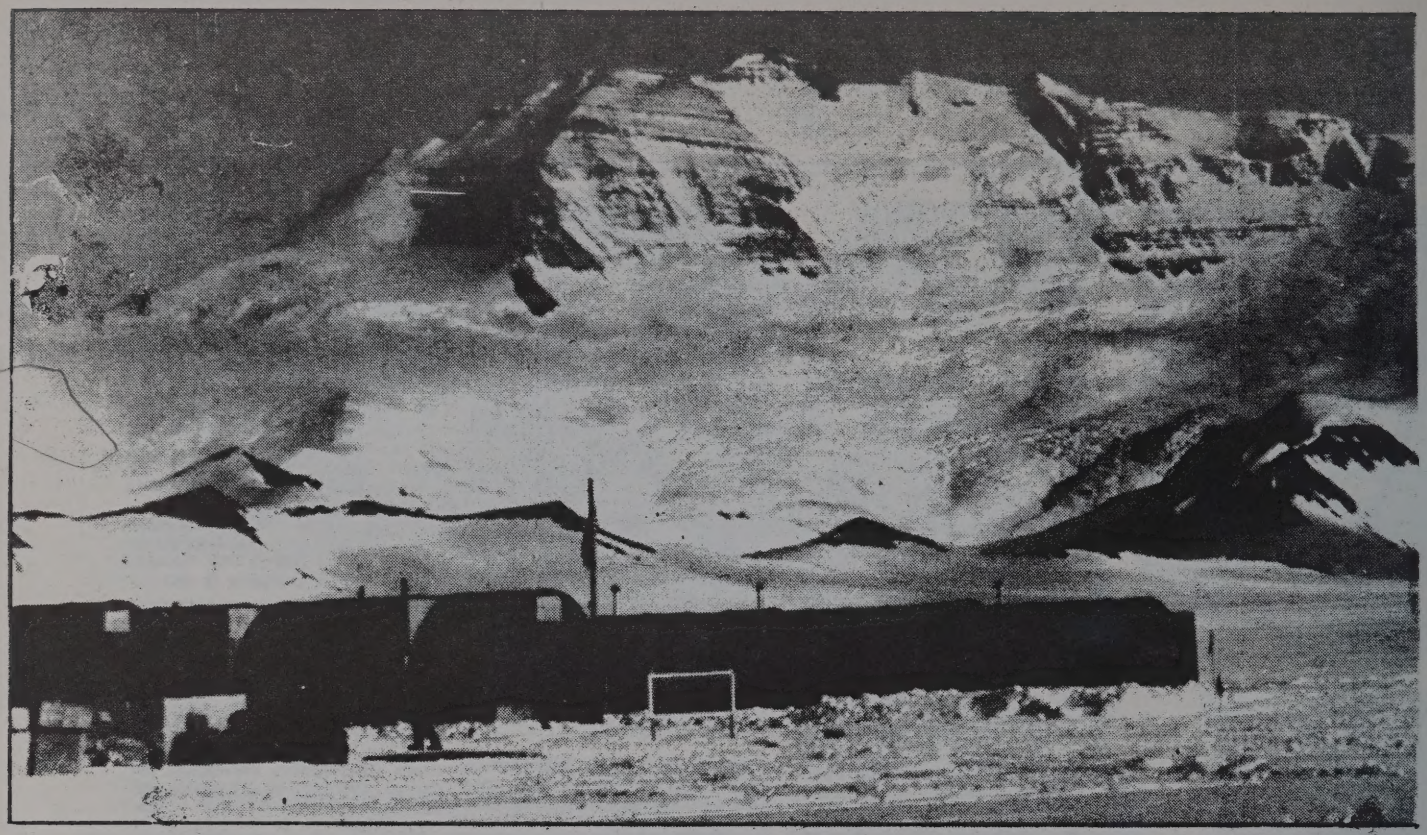
The first hole, produced by a "flame drill," made it possible to examine the underlying ocean and sea floor for clues to the past history of the shelf. Then, in 1978, a Soviet device with a heated ring melted a new hole, and top-to-bottom core samples of the ice were extracted.

The top 1,345 feet of ice was continental, having slipped off the continent and become waterborne some five centuries ago in a region 125 miles to the south. The bottom 33 feet, however, was frozen sea water, indicating that the southern part of the Ross Ice Shelf is gradually gaining ice from below.

Within this sea ice were zones rich in small objects whose nature, it was hoped, could further document the history of this growth process.

Specimens have now been melted at Columbia University's Lamont-Doherty Geological Observatory by Igor A. Zotikov of the Institute of Geography in Moscow, who participated in the drilling. The inclusions, examined by Dr. Floyd H. Burckle of the Lamont Observatory, have turned out to be the remains of microscopic diatoms dependent on sunlight. They must have lived in the open ocean.

"We didn't expect this at all," Dr. Burckle said last week. Some are from contemporary species but others became extinct as far back as nine million years ago. These fossils presumably were in some manner swept up from the ocean floor. Also included were capsules resembling eggs or cysts.



huts near Beardmore Glacier, site of the conference.

Los Angeles Times Photos

Inside the U.S. South Pole science station, one of four U.S. scientific bases on the continent